MONITORING INVASIVE SPECIES: PUTTING YOUR DUCKS IN A ROW

Brad Welch
National Park Service &
Colorado State University
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Overview

- Guiding Principles and Strategic Approach
- Complicating Issues and Concerns
- Monitoring Framework
- Monitoring Objectives
- What You Can Do Right Now!

NPS Definitions

An invasive species is 1) alien to the ecosystem under consideration *and*

2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

(NISC 1999)

Monitoring is the "collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a management objective."

(Elzinga et al. 1998)

Guiding Principles

- Invasive species are a pervasive threat to natural resources and ecosystem integrity throughout the NPS.

- Effective management of invasive species requires a strategic and comprehensive national program. (Detailed Action Plan for Nonnative Species 2000)

- Invasive species management programs function at all levels, involving individual park staff, Inventory and Monitoring network staff, Exotic Plant Management Teams (EPMTs), and regional and national technical support specialists representing all divisions.

Guiding Principles

•Prevention is the most effective means of managing invasive species.

"If it's raining, shut the window!" (Carlton 2004)

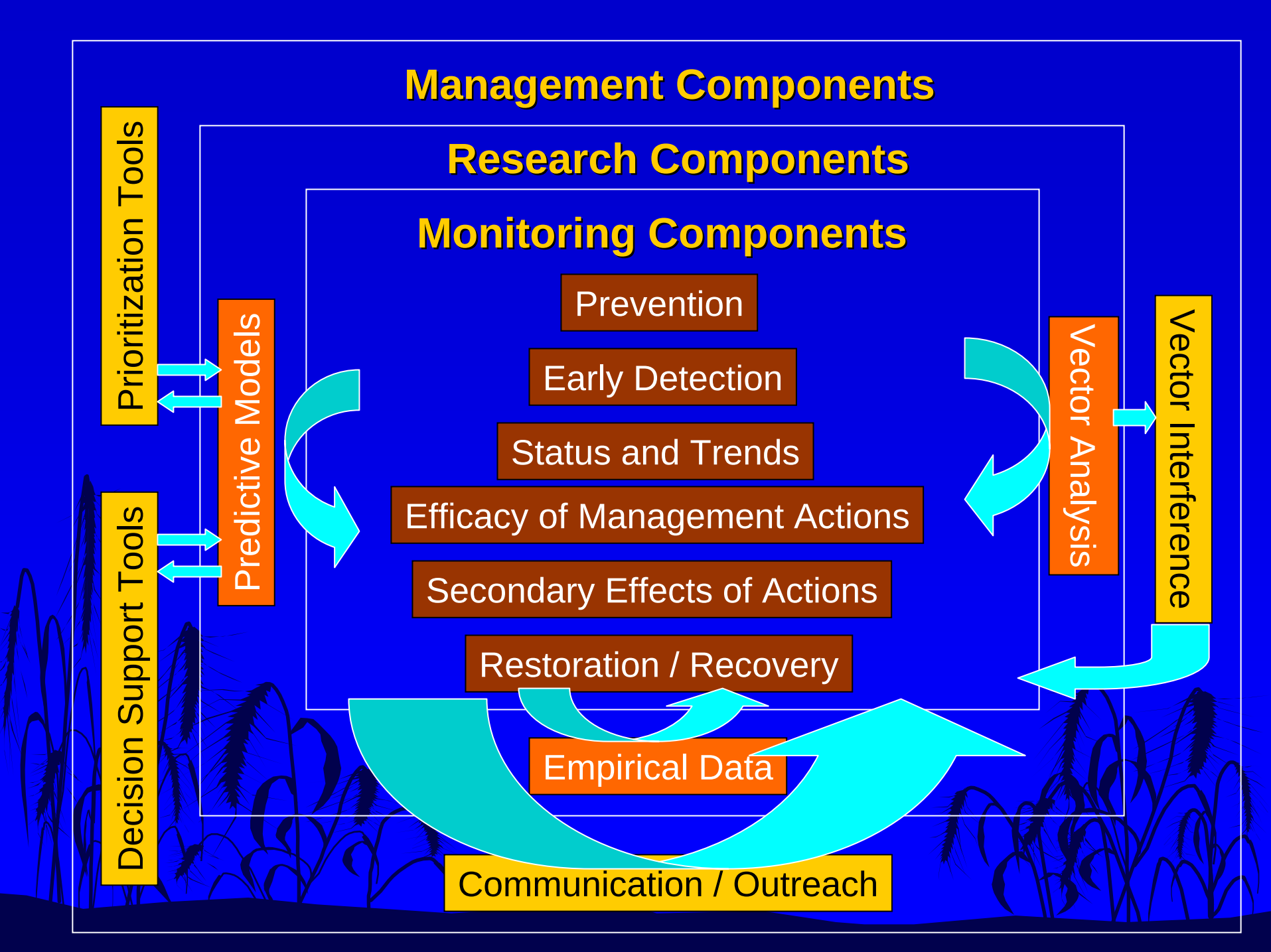
•Effective and integrated invasive species management requires a well-developed inventory and monitoring program to ensure long-term success.

•Communication, cooperation, and collaboration are essential to the success of any long-term management program.

What's Required of a Strategic Invasive Species Management Program?

Strategic approach (proactive vs. reactive) →

- Rigorous inventory / survey.
- Well-defined objectives.
- Priorities, planning, actions, and expected outcomes.
- Consistency, collaboration, and coordination!
- Well-designed monitoring program.
- Rapid response.
- Education & outreach.
- Data management.
- Management, monitoring, and research integration.


Management Components
Research Components
Monitoring Components
Prioritization Tools
Predictive Models
Decision Support Tools
Prevention
Early Detection
Status and Trends
Efficacy of Management Actions
Secondary Effects of Actions
Restoration / Recovery
Vector Analysis
Vector Interference
Empirical Data
Communication / Outreach

Real Issues and Concerns

- Limited resources.
- Limited monitoring.
- Monitoring inconsistencies within and among groups.
- Lack of coordination.
- Prioritization schemes variable or non-existent.
- Conflicting species priority lists across boundaries.

Real Issues and Concerns
(continued)

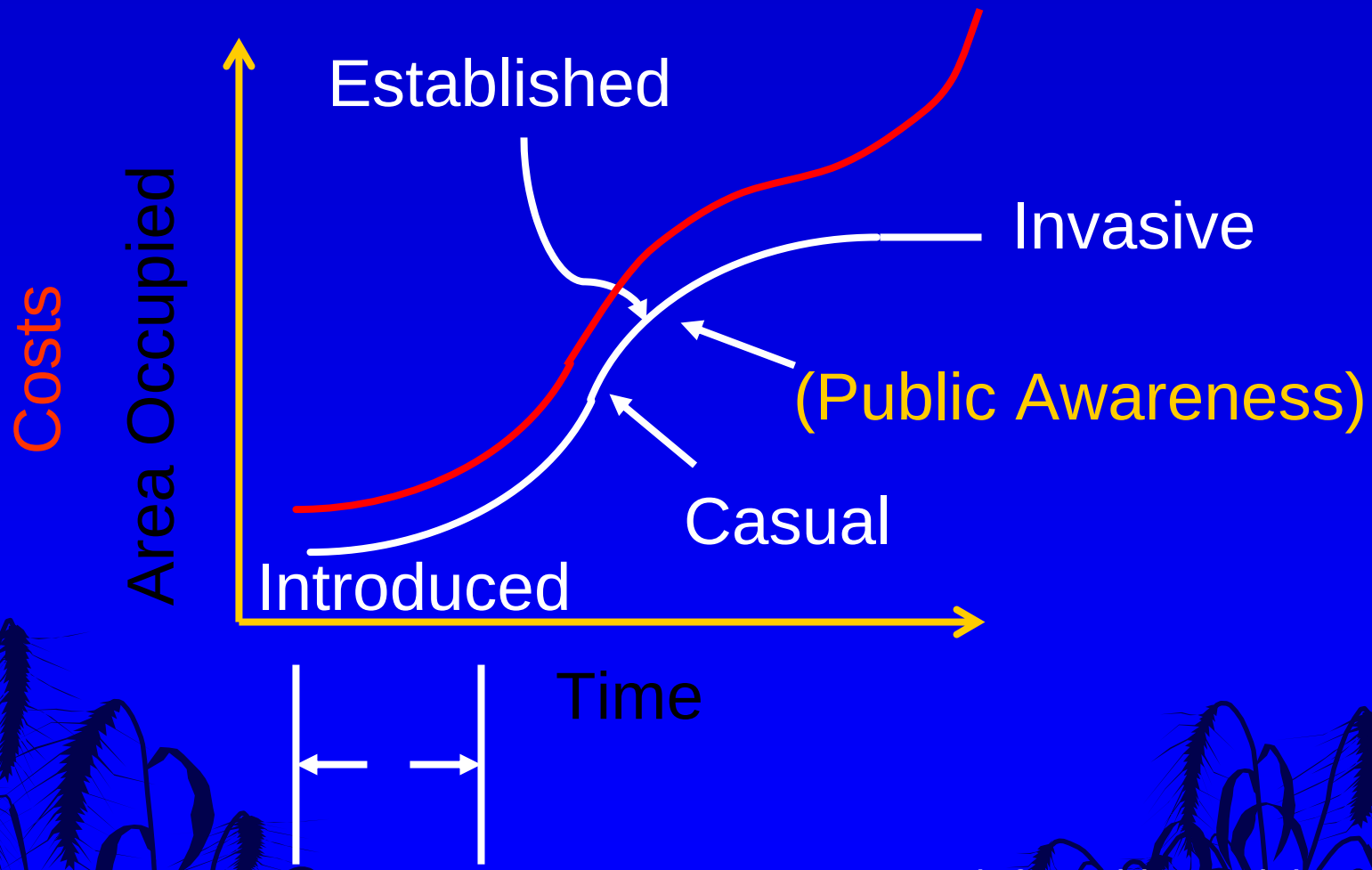
- Focus on established weeds vs. prevention / early detection.
- Species-by-species approach vs. vectors / pathways.
- Monitoring detracts from control efforts.
- Inter-agency communication limited.
- Lack of available protocols for aquatic species.
- NEPA compliance time-consuming and expensive.

What's in your wallet?

- Single biggest combined threat to natural areas (Marler 1998; Benjamin 2001)
- Estimated 50,000 non-native species introduced / year
- 1365 nonnative weeds in US (4678 globally)
- $137 billion / year in the US for invasive species control (Pimentel et al. 2000)
- 15 - 20% of IS operating budget devoted to monitoring (Choquenot and Warburton 1998; Gerlitzlehner 2003)

"Monitoring invasive species" is EXPENSIVE!

Management and Logistic Growth



(After Chippendale 1991, Naylor 2000, McNeely 2001)

The Solution

Monitoring Objectives

provide focus about the purpose or desired outcome of a particular monitoring program—

why, what, where, when

***Measurable and achievable!**

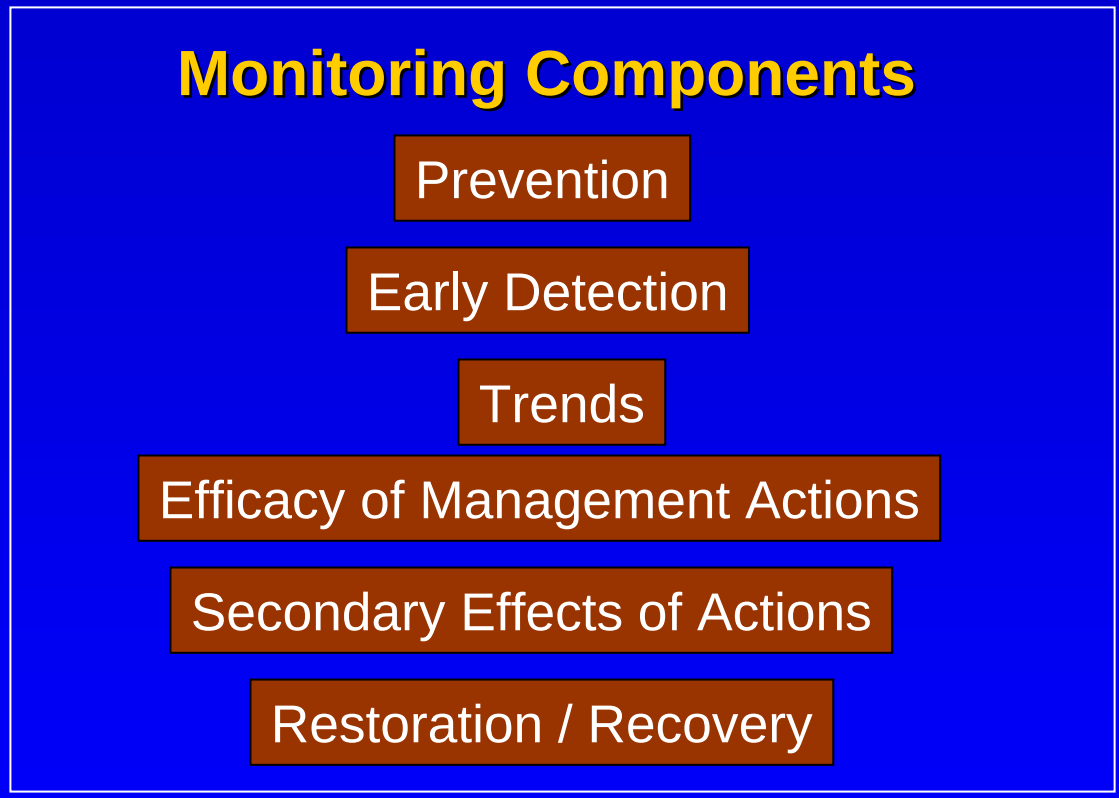
Objectives Framework

Management objective – clear statement of the desired future condition of a resource or the desired outcome of an action.

Monitoring objectives – provide focus about the purpose or desired outcome of a particular monitoring program.

Sampling objective – provides measurement details including confidence limits and acceptable error boundaries.

Invasive Species Monitoring Categories



The NPS I&M Focus

Early Detection

To monitor each of 10 sites of ecological significance in Grand Teton that are currently weed-free every year for the next 15 years to detect incursions of regional priority invasive plants.

Trends Monitoring

To annually track the percent cover of 12 known populations of *Typha angustifolia* in Sleeping Bear Dunes over the next 7 years with sufficient accuracy to detect a 20% change between monitoring events.

Effectiveness and Secondary Effects Monitoring

To determine with annual monitoring whether the 2004 *Tamarisk spp.* spray operation of two sites at Lake Mead achieved the 90% target reduction in adult stem density **and** to evaluate the extent of spray damage to native plant species.

Restoration Monitoring

To determine by 2004 whether the control of *Phragmites australis* in Cape Cod conducted in 2002 has led to 90% cover by native species representative of the vegetation prior to *Phragmites* invasion.

Desired Future Condition- Plan with the End in Mind

Invaded Site

Effective Control

Ecosystem Restoration

What To Do Right Now

- Conduct inventory / survey work.
- Define objectives – why, what, where, and when.
- Prioritize – objectives, values, species, sites!
- Identify thresholds – biology, management, detection.
- Think vectors and pathways.

What To Do Right Now
(continued)

- Include invasive-free zones.
- Foster communication.
- Emphasize education and outreach.
- Keep the end in mind (DFCs)!
- Work together!

Questions?

Brad Welch
970.267.2113
brad_welch@partner.nps.gov
http://science.nature.nps.gov/im/monitor/invasives.htm